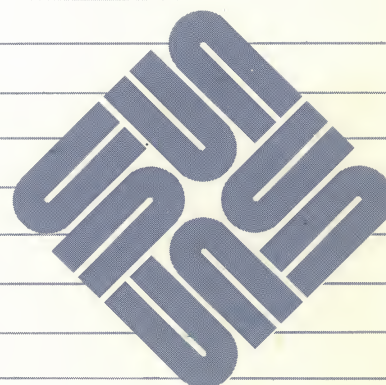




Sun-5 Slot Office Pedestal Cardcage Slot Assignments and Back- plane Configuration Procedures



Part No: 813-2068-10
Revision A of 17 April 1989





Sun-5 Slot Office Pedestal

Cardcage Slot Assignments and Back-plane Configuration Procedures

Sun Microsystems, Inc. • 2550 Garcia Avenue • Mountain View, CA 94043 • 415-960-1300

Part No: 813-2068-10
Revision A of 17 April 1989

VMEbus is a trademark of Motorola, Inc.

Sun Microsystems and Sun Workstation are registered trademarks of Sun Microsystems, Incorporated.

Sun, Sun-2, Sun-3 and Sun-4 are trademarks of Sun Microsystems, Incorporated.

The Sun logo  is a registered trademark of Sun Microsystems, Inc.

Multibus is a trademark of Intel Corporation.

CAUTION

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

Copyright © 1989 Sun Microsystems, Inc. – Printed in U.S.A.

All rights reserved. No part of this work covered by copyright hereon may be reproduced in any form or by any means – graphic, electronic, or mechanical – including photocopying, recording, taping, or storage in an information retrieval system, without the prior written permission of the copyright owner.

Restricted rights legend: use, duplication, or disclosure by the U.S. government is subject to restrictions set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause at DFARS 52.227-7013 and in similar clauses in the FAR and NASA FAR Supplement.

The Sun Graphical User Interface was developed by Sun Microsystems Inc. for its users and licensees. Sun acknowledges the pioneering efforts of Xerox in researching and developing the concept of visual or graphical user interfaces for the computer industry. Sun holds a non-exclusive license from Xerox to the Xerox Graphical User Interface, which license also covers Sun's licensees.

Contents

Chapter 1 Cardcage Slot Assignments and Backplane Configuration Procedure	3
1.1. Slot Description	3
Memory Configuration	4
Bus Grant and Jack	4
P4 boards and Slot 2	4
Graphics Boards	4
VMEbus Arbiter	4
1.2. Slot Assignment Matrix	5
1.3. Slot Assignment Precautions	5
 Appendix A Notes Regarding the ALM-2 and MCP Products	 9
A.1. Caution - Using the ALM-2 with the MCP or ALM-1	9
Physical Space Restriction Rule	9
VME Vector Interrupt Conflict	9
A.2. Vector Interrupt Table	9
Rule One	10
Rule Two	10
Rule Three	10
VME Address Conflict	11
Rule 4	11
Deskside System Restrictions	11
Rule Five	11

Appendix B	How to Read the Cardcage Slot Assignment and Backplane Configuration Tables	15
B.1.	Example Board Placement	16
	First	16
	Second	16
	Third	16
	Fourth	16
	Fifth	16
	Sixth	16
Index		21

Tables

Table 1-1 Slot Assignment Matrix	5
Table A-1 ALM-2 MCP and ALM-1 Vector Interrupt Assignments	9
Table B-1 Generic Cardcage Table	15



Figures

Figure 1-1 Backplane Slot Arrangement	3
---	---



Preface

This document contains information on the assignment of cardcage slots in the Sun 5-Slot Office Pedestal, precautions to take in the removal and replacement of the cards and special notes regarding the placement of the cards. Chapter 1, *Cardcage Slot Assignments and Backplane Configuration Procedure* includes a table that describes the location of the cards. The chapter also explains how the backplane jumpers are to be configured for the various options available for the system. The subsection *Slot Assignment Precautions*, explains removal and replacement procedures for cards with or without springfingers. Appendix A contains notes regarding the ALM-2 and MCP products. Appendix B contains additional instructions on using the assignment tables.



Cardcage Slot Assignments and Backplane Configuration Procedure

Cardcage Slot Assignments and Backplane Configuration Procedure	3
1.1. Slot Description	3
Memory Configuration	4
Bus Grant and Iack	4
P4 boards and Slot 2	4
Graphics Boards	4
VMEbus Arbiter	4
1.2. Slot Assignment Matrix	5
1.3. Slot Assignment Precautions	5





Cardcage Slot Assignments and Backplane Configuration Procedure

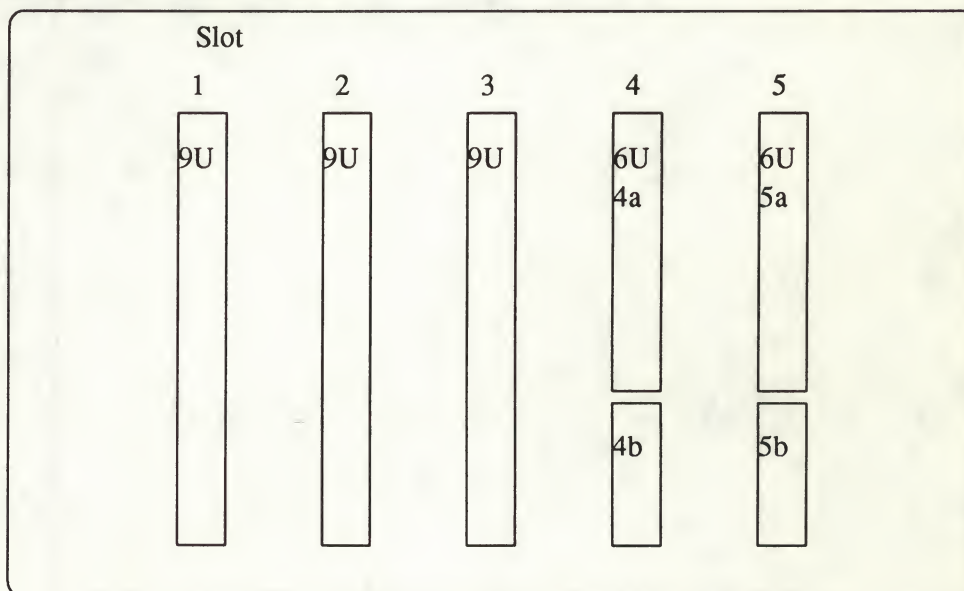
Table 1-1 in this chapter describes the cardcage slot assignments for the Sun 5-Slot Office Pedestal. The table vertically lists PCB slot priority in order of descending priority. Horizontal slot designations "A", "B", "C", etc., correspond to the preferred location for the specific board, with "A" being the most preferable location. If the only designation is "A", the board **MUST** be placed in that slot. Boards must be installed in descending order starting with the CPU board. If the boards are not installed in the proper order, the system may lose performance or functionality.

1.1. Slot Description

The office pedestal has 7 slots. Slots 1, 2, and 3 provide triple-height VMEbus slots (9U form factor). Slots 4 and 5 are divided into two sections each, 4a, 4b and 5a, 5b, that provide double-height VMEbus slots (6U form factor), and support Sun proprietary P2bus memory expansion cards.

The following figure shows the arrangement:

Figure 1-1 *Backplane Slot Arrangement*



Slot 1 always contains the CPU board.

Slots 2 and 3 contains various 9U form factor Sun boards or slot 2 may contain a P4 video card.

Slots 4a and 5a contains customer-installed double-height 6U form factor VMEbus boards

Slots 4b and 5b contain Sun P2 memory expansion cards.

Memory Configuration

Additional memory is provided in one or two P2 memory expansion boards that go into slots 4b and 5b.

Bus Grant and Iack

The backplane provides jumpers for the BG3 and IACK signals. In this system, IACK is never installed, and BG3 is only installed in slots containing CG9 or IPC boards. For access instructions, see the *Sun-4/330 Installation Manual*".

P4 boards and Slot 2

If any P4 expansion boards are mounted on the CPU board, slot 2 **must be unused**.

Graphics Boards

P4 color graphics boards may co-reside with CG9 color graphics boards

In order to install the CG9/GP2 combination, the P2 rear panel must be removed, and the CPU **cannot** have any P4 boards installed.

VMEbus Arbiter

The system can only tolerate one VMEbus arbiter; it must be the CPU board in Slot 1.

1.2. Slot Assignment Matrix

Table 1-1 describes the slot assignments for the 5 Slot Office Pedestal.

Table 1-1 Slot Assignment Matrix

BACKPLANE JUMPERS		BOARD NAME	SLOT POSITION						
BG3	IACK								
P X 0 3	P X 0 4								
OUT	OUT	CPU Board †	A						
OUT	OUT	1st 501-1221 MCP Board		B	A				
OUT	OUT	1st Sun ALM-2 501-1203		B	A				
IN	OUT	Sun 501-1268 GP2 Board ‡		B	A				
OUT	OUT	CG9 Color Board ‡ *		B	A				
OUT	OUT	2nd Enet Controller 501-1153		B	A				
OUT	OUT	501-1125 Sun IPC		B	A				
OUT	OUT	FDDI		B	A				
NA	NA	1st 6U VME board				A	B		
NA	NA	2nd 6U VME board					A		
NA	NA	1st 16 meg exp memory						A	B
NA	NA	2nd 16 meg exp memory							A

NOTES

- † Do not put any board in slot 2 if the CPU board contains any daughter boards.
- ‡ If a CG9/GP2 combination is going to be used, the CPU must not have any P4 daughter boards installed. The GP2 must be in slot 2, and the CG9 must be in slot 3. Also, the rear panel must be removed from slot 2.
- * The P4 color frame buffer and the CG9 color frame buffer may coexist in the same system. See *reference* for details.

1.3. Slot Assignment Precautions

Springfingers are metal strips that are installed between the edge of the PC board and the outer panel to reduce RFI emissions. Serrated metal “fingers” protrude from either side of the strip.

Installation of a board WITHOUT springfingers may affect RFI emissions and may therefore affect FCC compliance. Sun will no longer be responsible for FCC compliance if non-springfingered boards are added to a system originally shipped WITH springfingers and FCC approval.

If a board WITH springfingers is installed next to a board WITHOUT springfingers, the insulator shield on the outside of the fingers MUST be present to prevent possible shorting of component leads to the springfingers.

If an office pedestal contains boards WITH and WITHOUT springfingers, use the following guidelines:



- Before removing a board **WITHOUT** springfingers, remove the board to the left of it (or below it for desktop models) if that board is equipped **WITH** springfingers and an outer insulator shield
- To replace any filler panel equipped **WITH** springfingers, pull out the air restrictor panel far enough to allow the springfingers to lay against the panel. Push both units into place simultaneously and fasten with the appropriate fasteners. This procedure makes replacement of the filler panels easier and reduces the chance of damage to the springfingers.
- Always install a board **WITHOUT** springfingers first, and then replace the board **WITH** springfingers and insulator shield in the slot to the left of it (or below it).

If a board **WITH** springfingers is installed next to a board or filler panel also equipped **WITH** springfingers, the outside insulator shields should be removed.

Ensure that the insulator strip between the inner side of the springfingers and the PC board is intact at all times.

When removing and replacing boards with springfingers, check the condition of the insulator strip/shield(s) and replace if damaged. These parts can be obtained in kit number 560-1183-02. The insulator itself is P/N 330-1100-01.

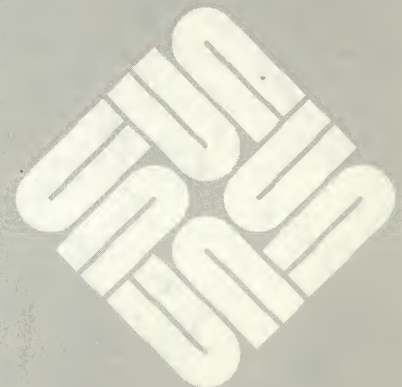
Call your Sun service hotline number with any questions, or for information on how to obtain additional insulator strips or shields. Information on the hotline numbers is provided in 800-3400.

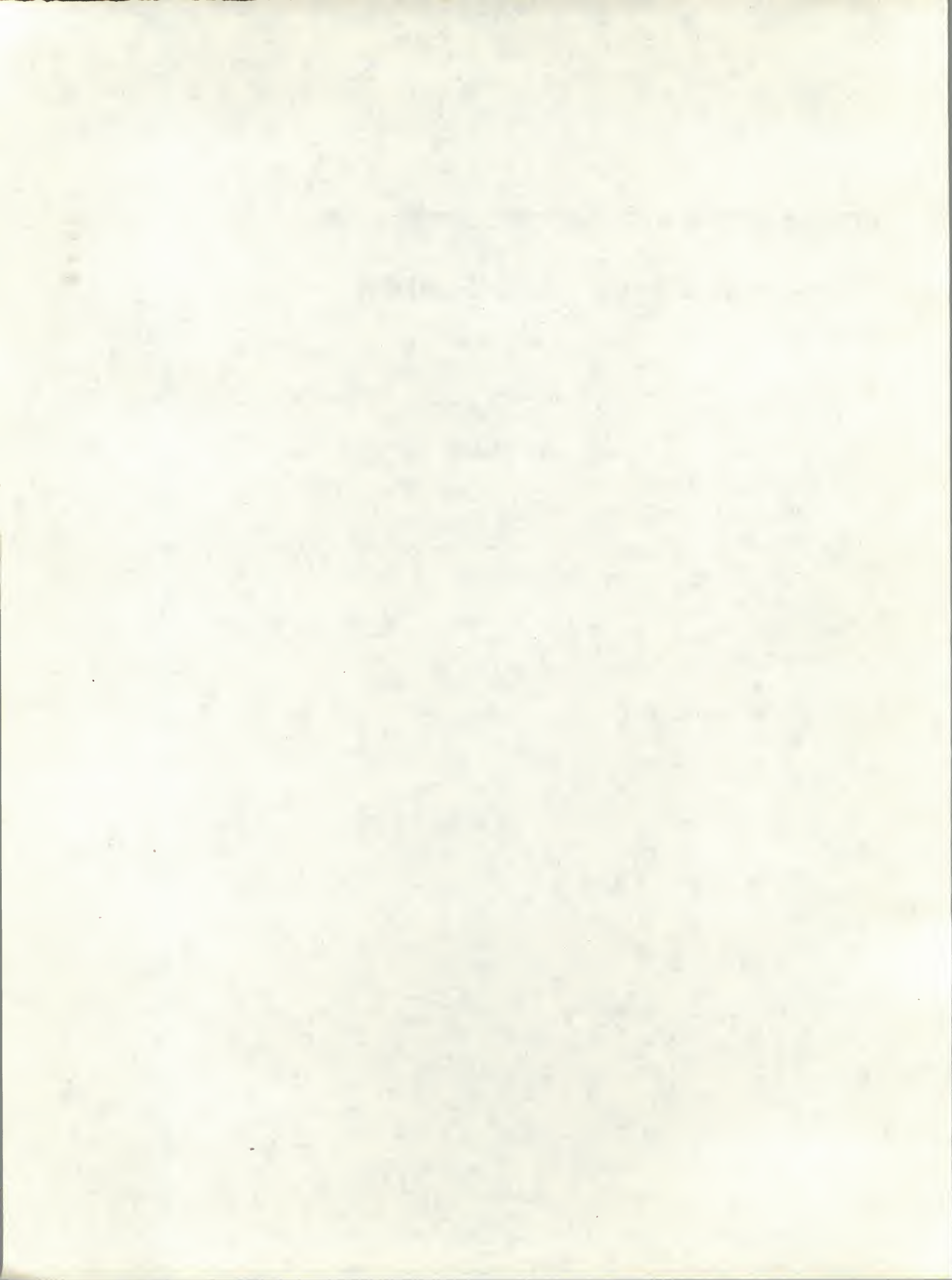
Printed circuit boards contain components sensitive to damage from electrostatic discharge that may occur, for example, when you walk across a carpet and then touch the board. If a grounding device is available, wear it when handling the board. Otherwise, place your hand on a conductive surface that is grounded to a common earth ground (such as the metal screw or plate on the AC wall receptacle), to discharge any static electricity from your body before handling the board.

A

Notes Regarding the ALM-2 and MCP Products

Notes Regarding the ALM-2 and MCP Products	9
A.1. Caution - Using the ALM-2 with the MCP or ALM-1	9
Physical Space Restriction Rule	9
VME Vector Interrupt Conflict	9
A.2. Vector Interrupt Table	9
Rule One	10
Rule Two	10
Rule Three	10
VME Address Conflict	11
Rule 4	11
Deskside System Restrictions	11
Rule Five	11





Notes Regarding the ALM-2 and MCP Products

A.1. Caution - Using the ALM-2 with the MCP or ALM-1

The ALM-2 shares VME vector interrupt assignments with the ALM-1 and the MCP. The ALM-2 also shares VME address space with the MCP. Because of these possible conflicts, and a possible physical space restriction in the enclosure, the following rules must be applied when installing an ALM-2 into a system that also contains MCPs and ALM-1s.

Physical Space Restriction Rule

If three ALM-1s (with their associated mux boxes) are already installed into the rear of the pedestal, there will be no room to mount the ALM-2's Device Connector Assembly (DCA). If this is the case in your installation, there are instructions in the Installation Manual for mounting the ALM-2's DCA to the floor or wall. This is permitted.

VME Vector Interrupt Conflict

The ALM-2 and the MCP share the *exact same* vector interrupt assignments. The ALM-1 has vector interrupt assignments that are in *conflict* with the ALM-2 (and the MCP). The following Table shows the assignments and illustrates the possible conflict.

A.2. Vector Interrupt Table

Table A-1 ALM-2 MCP and ALM-1 Vector Interrupt Assignments

ALM-2 MCP and ALM-1 Vector Interrupt Assignments			
Installed Board	Device Entry Number	VME Vector Interrupt Assignment (Hexadecimal)	
		ALM-1	ALM-2 and MCP
1st Board	Ø	88	8b
2nd Board	1	89	8a
3rd Board	2	8a	89
4th Board	3	8b	88

As you can see from the Table, the vector interrupt assignments of the ALM-1 and ALM-2 are in the exact opposite order, and the vector interrupt assignments of the

ALM-2 and the MCP are the same. This makes the following rules necessary.

Rule One

No more than four ALM-1, ALM-2 or MCP boards *altogether* may be installed in a single cardcage. This *does not* mean four of each kind, it means four boards *total*.

If you look at the preceding Table closely, you will see that if more than four boards were installed, two of the boards would have identical vector interrupt assignments. This will cause duplication errors of assigned vector interrupts.

Rule Two

When installing the Sun ALM-2 or MCP, the boards *must* be installed in proper address order. There are four VME board address positions available that can accommodate either the Sun ALM-2 or MCP board. Therefore, one address position can only accommodate one board type, and any MCP or ALM-2 must be installed in the proper board device sequence:

1st board (MCP or ALM-2)	Device Ø
2nd board (MCP or ALM-2)	Device 1
3rd board (MCP or ALM-2)	Device 2
4th board (MCP or ALM-2)	Device 3

NOTE *Refer to the specific ALM-2 or MCP Configuration Procedure for information on board device addressing.*

For example, if you had two MCP boards already installed (1st and 2nd Sun MCP boards) and you then wanted to install two Sun ALM-2 boards, you would need to configure and install the two ALM-2 boards as the 3rd and 4th ALM-2 boards respectively. This address order is exclusive of the Sun ALM-1 board addressing. This rule also applies if MCP boards are to be added to a system already containing ALM-2 boards.

NOTE *For information on ALM-1 board addressing, refer to the ALM-1 Configuration Procedure (Sun P/N 813-2008) for information on setting/verifying the ALM-1 board address.*

Rule Three

When installing the Sun ALM-1, it must be installed in the proper sequential board address order: with the first board installed as the 1st Sun ALM-1 and so forth. For Deskside systems that support the ALM-1, only one ALM-1 board can co-reside with the MCP and/or ALM-2 boards. The address order for the ALM-1 is exclusive of the Sun ALM-2 or MCP addressing.

It is necessary to refer to the next subsection, *VME Address Conflict*, to understand the sharing of VME address space of the ALM-2 and MCP boards and determine their correct cardcage slot assignment. The ALM-1 does not share VME address space with the ALM-2 or MCP; therefore, its slot assignment is independent of the ALM-2 or MCP.

VME Address Conflict

The ALM-2 and MCP boards occupy the identical VME address space as well as interrupt vectors, and both are known to the CPU as mcp x (where x is a number 0 through 3). So, for example, if two MCP boards are already present in the cardcage and you wish to add an ALM-2, the ALM-2 would be designated as mcp2 in the VME addressing (with the two MCP boards being designated mcp0 and mcp1 respectively).

Rule 4

The ALM-2 and MCP must not be installed using identical VME addresses (board device numbers).

The ALM-2 board number (VME Address) is hardware selected on the board. If necessary, refer to the ALM-2 Configuration Procedure (Sun P/N 813-2042-XX) for information on setting/verifying the ALM-2 board address (board *address* selection is identical for the MCP).

Deskside System Restrictions**Rule Five**

For Deskside systems that support the ALM-1, only one ALM-1 board may co-reside in the Deskside cardcage with ALM-2 and MCP boards.



B

How to Read the Cardcage Slot Assignment and Backplane Configuration

Tables

How to Read the Cardcage Slot Assignment and Backplane

Configuration Tables 15

B.1. Example Board Placement 16

First 16

Second 16

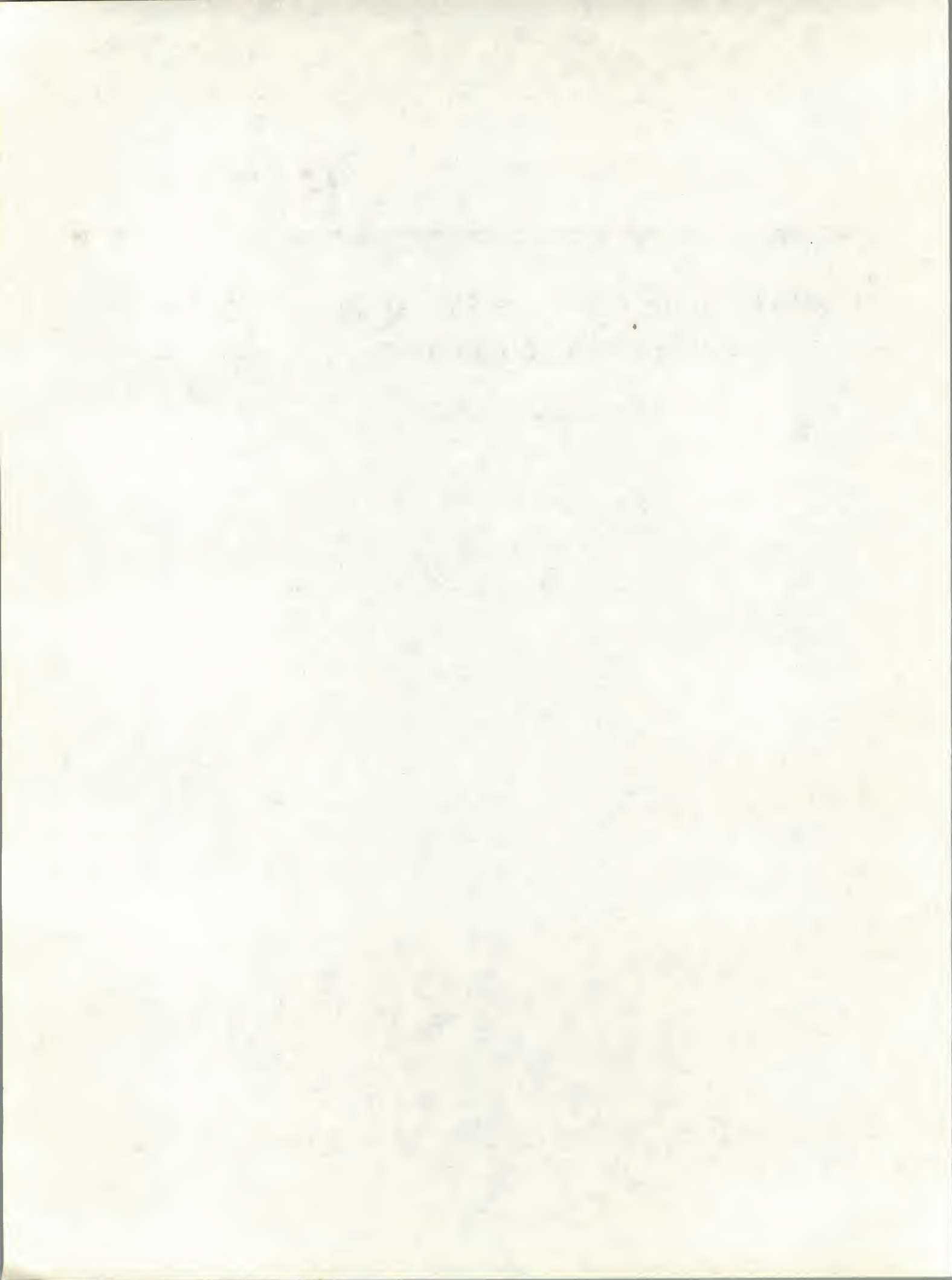
Third 16

Fourth 16

Fifth 16

Sixth 16





B

How to Read the Cardcage Slot Assignment and Backplane Configuration Tables

Table B-1 Generic Cardcage Table

BACKPLANE JUMPERS		BOARD NAME	BACKPLANE SLOT POSITION					
BG3	IACK			#	#	#	#	#
P	P							
X	X							
0	0							
3	4							
OUT	OUT	CPU Board	A					
IN	IN	1st Memory Expansion Board		A				
IN	IN	FPA Board				A		
IN	IN	2nd Memory Expansion Board			A			
IN	IN	3rd Memory Expansion Board				A		
OUT	OUT	Graphics Processor					A	
IN	IN	Graphics Buffer						A
OUT	OUT	VME SCSI Ctlr		A	B	C	D	E
IN	OUT	VME Color		A	B	C	D	E
OUT	OUT	2nd Ethernet Ctlr		A	B	C	D	E

This table is for illustration purposes only. It should not be used to place boards in any Sun systems you might have.

This example table shows that these particular ten products have been qualified by Sun as possible entries into this hypothetical six-slot cardcage. The products are listed in a vertical column *in the order that they must be inserted into the cardcage*.

B.1. Example Board Placement

Suppose you have the following six boards to be inserted into this six-slot cardcage:

CPU board
SCSI board
2 Memory Expansion boards
Floating Point Accelerator (FPA) board
2nd Ethernet Controller board

Compare the boards you have with the boards listed in the *Generic Cardcage Table*. The boards will be assigned in the vertical order that they occur in the table. If they are not placed in the given descending order, the system may lose performance or functionality.

First

CPU board in slot 1: The letter A in slot 1 indicates that the only position for the CPU is in slot 1.

Second

1st memory board in slot 2: The letter A in slot 2 indicates that the only position for the 1st memory board is in slot 2.

Third

FPA in slot 4: The FPA is the next item in the table, so it must be placed before the 2nd memory board. The FPA must be placed in slot 4. Note that if you had a 3rd memory board and an FPA, then you would have placed the FPA in slot 4 only to discover that the 3rd memory board should also be placed in slot 4. According to the rules of precedence, since the 3rd memory board is listed two places lower on the table than the FPA, you cannot have a 3rd memory board when you also have the FPA.

Fourth

The 2nd memory board in slot 3: The letter A in slot 3 indicates that the only position for the 2nd memory board is in slot 3.

Fifth

SCSI controller in slot 5: Whenever there is a choice, in this case slots 2 through 5, you must see which slots you have already filled. Slots 5 and 6 are left, but the letter D in slot 5 has a higher priority than letter E, so the board is placed in slot 5.

Sixth

2nd ethernet in slot 6: The 2nd ethernet is the lowest on the list of the products used in this example, so it is placed in the last slot available in the cardcage, represented by letter E in the table.

Revision History

<i>Revision</i>	<i>Date</i>	<i>Comments</i>
01-01	7 October 1988	Review Draft
01-05	02 November 1988	Beta Draft
50-03	10 February 1989	Second Beta Draft
A-10	17 April 1989	Release to Production

NOTE This document was originally Appendix B of the 5-Slot Logic Enclosure Installation Manual, P/N 800-3199-03.



CARDCAGE SLOT ASSIGNMENTS MANUAL READER COMMENT SHEET

We who work at Sun Microsystems wish to provide the best possible documentation for our products. To this end, we solicit your comments on the *5 Slot Office Pedestal Cardcage Assignments and Backplane Configuration Procedures* Part Number 813-2068-10. We would appreciate your telling us about errors in the content of the manual, and about any material that you feel should be there but isn't.

Typographical Errors

Please list typographical errors by page number and actual text of the error.

Technical Errors

Please list errors in technical accuracy by page number and actual text of the error.

Content

Did this guide meet your needs? If not, please indicate what you think should be added or deleted in order to do so. Please comment on any material that you feel should be present but is not. Is there material found in other manuals that would be more convenient if it were in this manual?

Layout and Style

Did you find the organization of this guide useful? If not, how would you rearrange things? Do you find the style of this manual pleasing or irritating? What would you like to see different?

Mail this completed form to:

Manager, Hardware Technical Publications
Sun Microsystems, Inc.
2550 Garcia Avenue
Mountain View, CA 94043









Corporate Headquarters
Sun Microsystems, Inc.
2550 Garcia Avenue
Mountain View, CA 94043
415 960-1300
TLX 37-29639

**For U.S. Sales Office
locations, call:**
800 821-4643
In CA: 800 821-4642

European Headquarters
Sun Microsystems Europe, Inc.
Bagshot Manor, Green Lane
Bagshot, Surrey GU19 5NL
England
0276 51440
TLX 859017

Australia: (02) 413 2666
Canada: 416 477-6745
France: (1) 40 94 80 00

Germany: (089) 95094-0
Hong Kong: 852 5-8651688
Italy: (39) 6056337
Japan: (03) 221-7021
Korea: 2-7802255
Nordic Countries: + 46 (0)8 7647810
PRC: 1-8315568
Singapore: 224 3388
Spain: (1) 2532003
Switzerland: (1) 8289555
The Netherlands: 3133501234

Taiwan: 2-7213257
UK: 0276 62111

**Europe, Middle East, and Africa,
call European Headquarters:**
0276 51440

**Elsewhere in the world,
call Corporate Headquarters:**
415 960-1300
Intercontinental Sales

